FIG. 1A

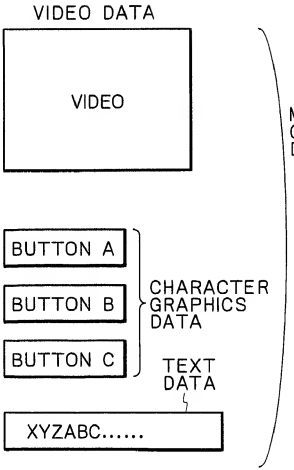


FIG. 1B

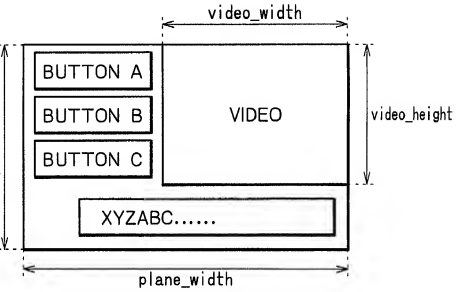


FIG. 2A

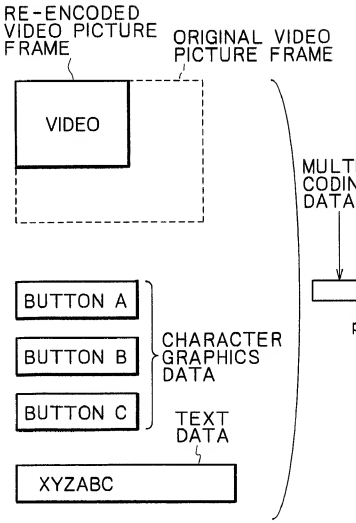

RE-ENCODED VIDEO PICTURE FRAME
ORIGINAL VIDEO PICTURE FRAME
VIDEO
BUTTON A
BUTTON B
BUTTON C
CHARACTER GRAPHICS DATA
TEXT DATA
XYZABC
MULTIMEDIA CODING DATA

FIG. 2B

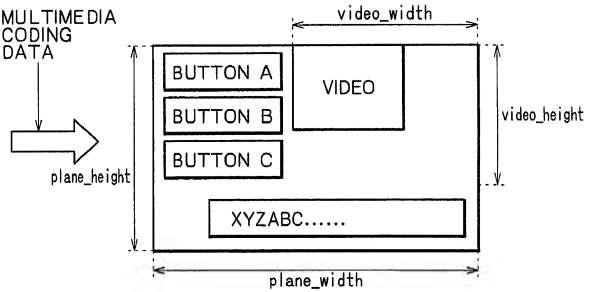

video_width
BUTTON A
BUTTON B
BUTTON C
VIDEO
video_height
plane_height
XYZABC.....
plane_width

FIG. 3

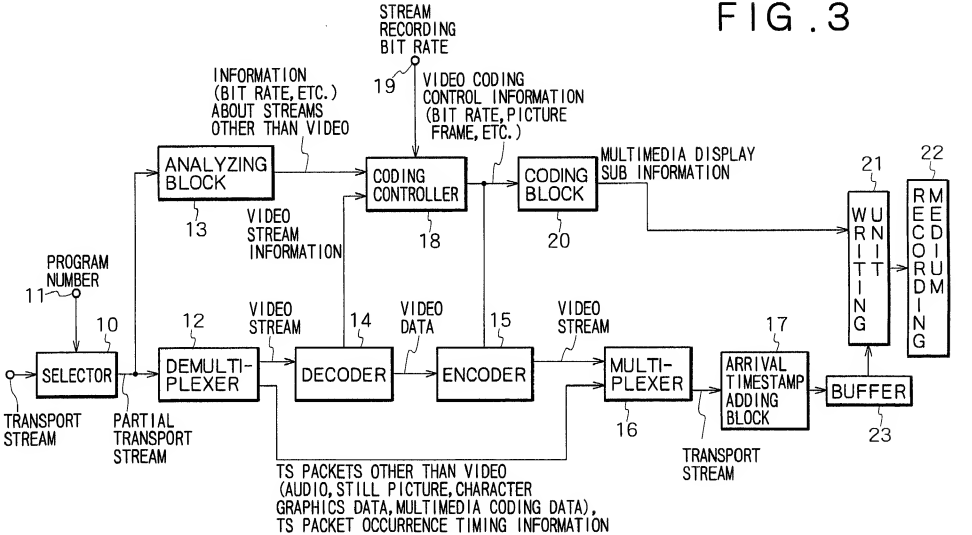

STREAM RECORDING BIT RATE
19
INFORMATION (BIT RATE, ETC.) ABOUT STREAMS OTHER THAN VIDEO
VIDEO CODING CONTROL INFORMATION (BIT RATE, PICTURE FRAME, ETC.)
ANALYZING BLOCK
13
VIDEO STREAM INFORMATION
CODING CONTROLLER
18
CODING BLOCK
20
MULTIMEDIA DISPLAY SUB INFORMATION
21
WRITING UNIT
22
RECORDING MEDIUM
PROGRAM NUMBER
11
10
SELECTOR
TRANSPORT STREAM
PARTIAL TRANSPORT STREAM
12
DEMULTI-PLEXER
VIDEO STREAM
14
DECODER
VIDEO DATA
15
ENCODER
VIDEO STREAM
MULTI-PLEXER
16
17
ARRIVAL TIMESTAMP ADDING BLOCK
TRANSPORT STREAM
BUFFER
23
TS PACKETS OTHER THAN VIDEO (AUDIO, STILL PICTURE, CHARACTER GRAPHICS DATA, MULTIMEDIA CODING DATA), TS PACKET OCCURRENCE TIMING INFORMATION

FIG. 4A

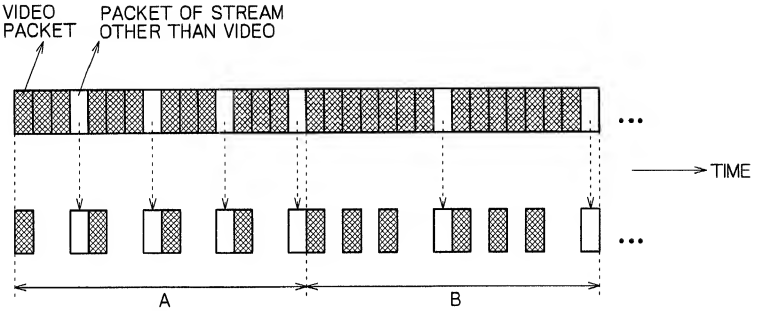


FIG. 4B

FIG. 5A

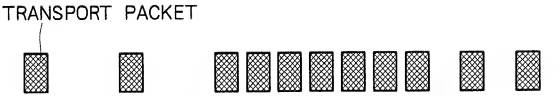


FIG. 5B

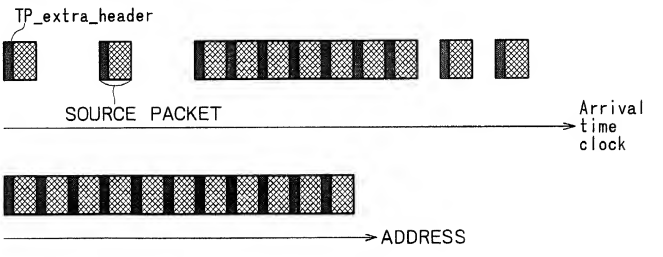


FIG. 5C

FIG.6

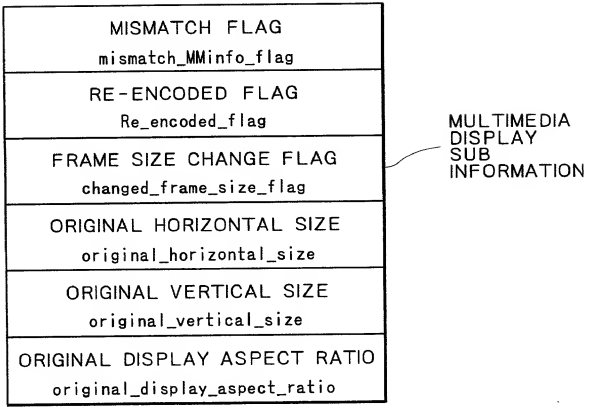

MISMATCH FLAG
mismatch_MMinfo_flag
RE-ENCODED FLAG
Re_encoded_flag
FRAME SIZE CHANGE FLAG
changed_frame_size_flag
ORIGINAL HORIZONTAL SIZE
original_horizontal_size
ORIGINAL VERTICAL SIZE
original_vertical_size
ORIGINAL DISPLAY ASPECT RATIO
original_display_aspect_ratio
MULTIMEDIA DISPLAY SUB INFORMATION

FIG. 7

Syntax	No. of bits	Mnemomic
ProgramInfo() {		
length	32	uimsbf
reseved_for_word_align	8	bslbf
num_of_program_sequences	8	uimsbf
for(i=0;i<*num_of_program_sequences*;i++) {		
SPN_program_sequences_start	32	uimsbf
program_map_PID	16	bslbf
num_of_streams_in_ps	8	uimsbf
num_of_groups	8	uimsbf
for(*stream_index*=0; *stream_index*<*num_of_streams_in_ps*; *stream_index*++) {		
stream_PID	16	uimsbf
StreamCodingInfo()		
}		
if(*num_of_groups*>1) {		
for(i=0;i<*num_of_groups*;i++) {		
num_of_streams_in_group	8	uimsbf
for(k=0;k<*num_of_streams_in_group*;k++) {		
stream_index	8	uimsbf
}		
if(num_of_streams_in_group%2==0) {		
reserved_for_word_align	8	bslbf
}		
}		
}		
}		
}		

EXAMPLE OF ProgramInfo() SYNTAX

FIG.8

Syntax	No. of bits	Mnemomic
StreamCodingInfo() {		
length	8	bslbf
stream_coding_type	8	uimsbf
if(*stream_coding_type*==0x02) {		
video_format	4	uimsbf
frame_rate	4	uimsbf
display_aspect_ratio	4	uimsbf
reserved_for_word_align	2	bslbf
cc_flag	1	uimsbf
orlginal_video_format_flag	1	
if(*original_video_format_flag*==1) {		
original_video_format	4	uimsbf
original_display_aspect_ratio	4	uimsbf
reserved_for_word_align	8	bslbf
}		
}else if(*stream_coding_type*==0x03// *stream_coding_type*==0x04// *stream_coding_type*==0x0F// *stream_coding_type*==0x80// *stream_coding_type*==0x81) {		
audio_presentation_type	4	uimsbf
sampling_frequency	4	uimsbf
reserved_for_word_align	8	bslbf
}		
}		

StreamCodingInfo() SYNTAX(ANOTHER EXAMPLE OF MULTIMEDIA DISPLAY SUB INFORMATION)

FIG. 9

stream_coding_type

stream_coding_type	Meaning
0x00-0x01	reserved for future use
0x02	MPEG-1 or MPEG-2 video stream
0x03	MPEG-1 audio
0x04	MPEG-2 multi-channel audio, backward compatible to MPEG-1
0x05	reserved for future use
0x06	Teletext defined in SESF or DVB or Subtitle defined in ISDB
0x07-0x09	reserved for future use
0x0A	ISO/IEC 13818-6 type A
0x0B	ISO/IEC 13818-6 type B
0x0C	ISO/IEC 13818-6 type C
0x0D	ISO/IEC 13818-6 type D
0x0E	reserved for future use
0x0F	MPEG-2 AAC audio with ADTS transport syntax
0x10-0x7F	reserved for future use
0x80	SESF LPCM audio
0x81	Dolby AC-3 audio
0x82-0xFF	reserved for future use

FIG. 10

video_format

video_format	Meaning	Video standard
0	480i	ITU-R BT.601-4
1	576i	ITU-R BT.601-4
2	480p	SMPTE 293M
3	1080i	SMPTE 274M
4	720p	SMPTE 296M
5-14	reserved for future use	
15	No information	

FIG. 11

frame_rate

frame_rate	Meaning
0	reserved for future use
1	24 000/1001 (23.976...)
2	24
3	25
4	30 000/1001 (29.97...)
5	30
6	50
7	60 000/1001 (59.94...)
8	60
9-14	reserved for future use
15	No information

FIG. 12

display_aspect_ratio

display_aspect_ratio	Meaning
0	reserved for future use
1	reserved for future use
2	4:3 display aspect ratio
3	16:9 display aspect ratio
4	2.21:1 display aspect ratio
5-14	reserved for future use
15	No information

FIG. 13

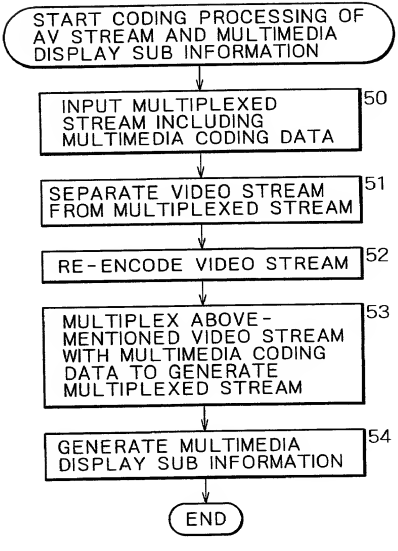

START CODING PROCESSING OF AV STREAM AND MULTIMEDIA DISPLAY SUB INFORMATION
INPUT MULTIPLEXED STREAM INCLUDING MULTIMEDIA CODING DATA
50
SEPARATE VIDEO STREAM FROM MULTIPLEXED STREAM
51
RE-ENCODE VIDEO STREAM
52
MULTIPLEX ABOVE-MENTIONED VIDEO STREAM WITH MULTIMEDIA CODING DATA TO GENERATE MULTIPLEXED STREAM
53
GENERATE MULTIMEDIA DISPLAY SUB INFORMATION
54
END

FIG. 14

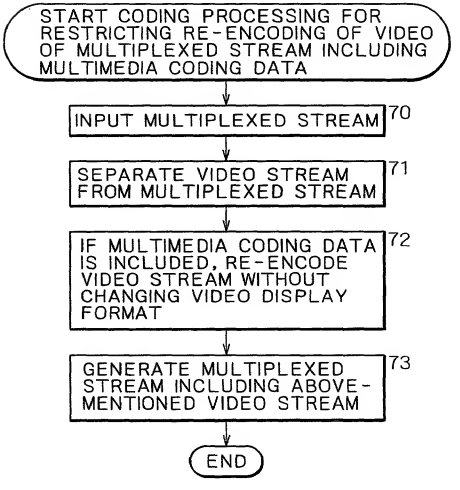

START CODING PROCESSING FOR RESTRICTING RE-ENCODING OF VIDEO OF MULTIPLEXED STREAM INCLUDING MULTIMEDIA CODING DATA
INPUT MULTIPLEXED STREAM
70
SEPARATE VIDEO STREAM FROM MULTIPLEXED STREAM
71
IF MULTIMEDIA CODING DATA IS INCLUDED, RE-ENCODE VIDEO STREAM WITHOUT CHANGING VIDEO DISPLAY FORMAT
72
GENERATE MULTIPLEXED STREAM INCLUDING ABOVE-MENTIONED VIDEO STREAM
73
END

FIG. 15

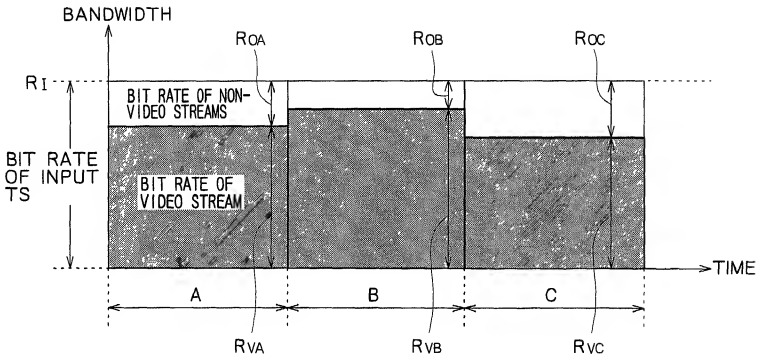
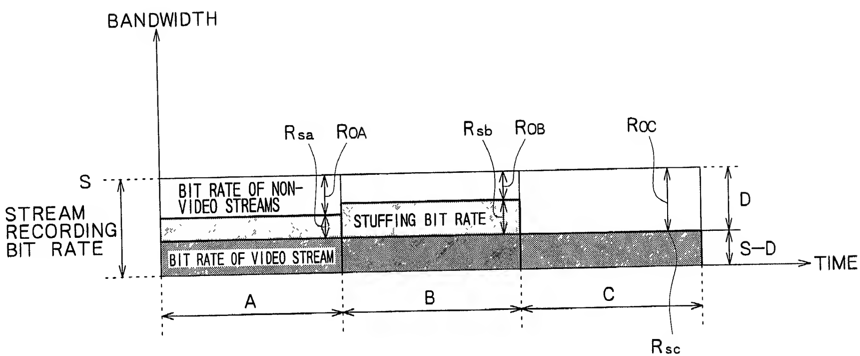

BANDWIDTH
ROA
ROB
ROC
RI
BIT RATE OF NON-VIDEO STREAMS
BIT RATE OF INPUT TS
BIT RATE OF VIDEO STREAM
TIME
A
B
C
RVA
RVB
RVC

FIG. 16



BANDWIDTH
S
STREAM RECORDING BIT RATE
BIT RATE OF NON-VIDEO STREAMS
BIT RATE OF VIDEO STREAM
STUFFING BIT RATE
Rsa
ROA
Rsb
ROB
ROC
Rsc
D
S−D
TIME
A
B
C

FIG. 17

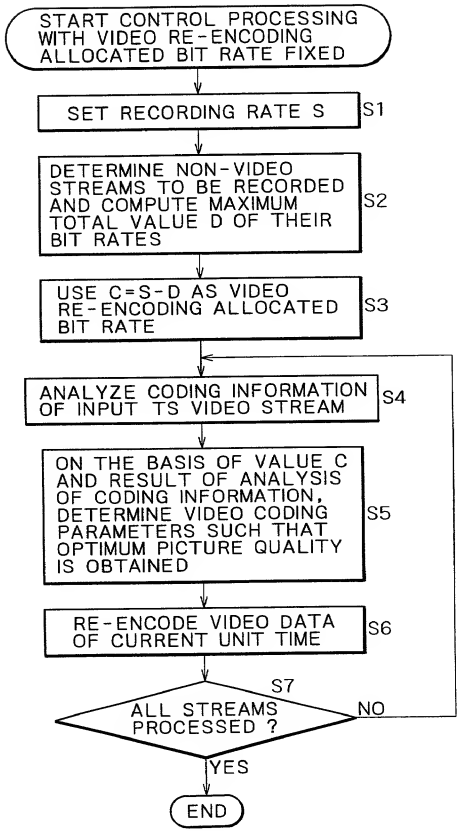

START CONTROL PROCESSING WITH VIDEO RE-ENCODING ALLOCATED BIT RATE FIXED
SET RECORDING RATE S
S1
DETERMINE NON-VIDEO STREAMS TO BE RECORDED AND COMPUTE MAXIMUM TOTAL VALUE D OF THEIR BIT RATES
S2
USE C=S-D AS VIDEO RE-ENCODING ALLOCATED BIT RATE
S3
ANALYZE CODING INFORMATION OF INPUT TS VIDEO STREAM
S4
ON THE BASIS OF VALUE C AND RESULT OF ANALYSIS OF CODING INFORMATION, DETERMINE VIDEO CODING PARAMETERS SUCH THAT OPTIMUM PICTURE QUALITY IS OBTAINED
S5
RE-ENCODE VIDEO DATA OF CURRENT UNIT TIME
S6
S7
ALL STREAMS PROCESSED ?
NO
YES
END

FIG. 18

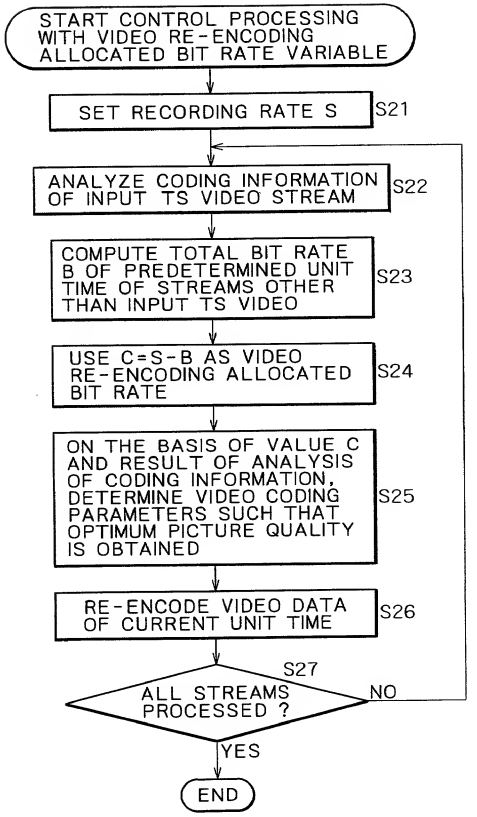

START CONTROL PROCESSING WITH VIDEO RE-ENCODING ALLOCATED BIT RATE VARIABLE
SET RECORDING RATE S
S21
ANALYZE CODING INFORMATION OF INPUT TS VIDEO STREAM
S22
COMPUTE TOTAL BIT RATE B OF PREDETERMINED UNIT TIME OF STREAMS OTHER THAN INPUT TS VIDEO
S23
USE C=S-B AS VIDEO RE-ENCODING ALLOCATED BIT RATE
S24
ON THE BASIS OF VALUE C AND RESULT OF ANALYSIS OF CODING INFORMATION, DETERMINE VIDEO CODING PARAMETERS SUCH THAT OPTIMUM PICTURE QUALITY IS OBTAINED
S25
RE-ENCODE VIDEO DATA OF CURRENT UNIT TIME
S26
S27
ALL STREAMS PROCESSED ?
NO
YES
END

FIG. 19

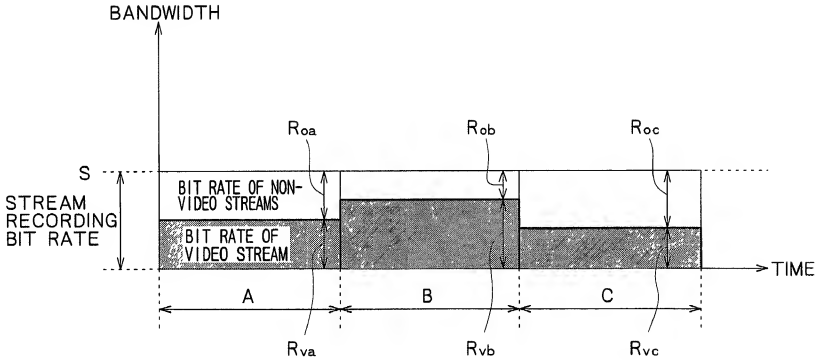


FIG. 20

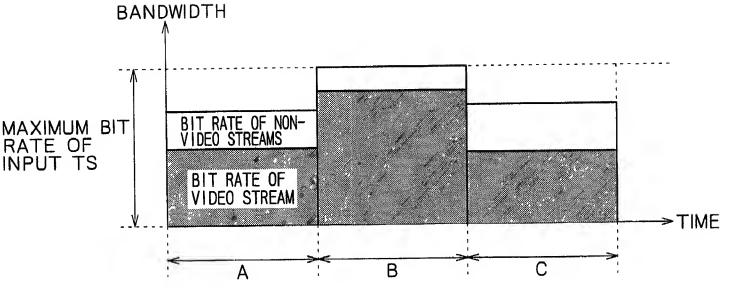
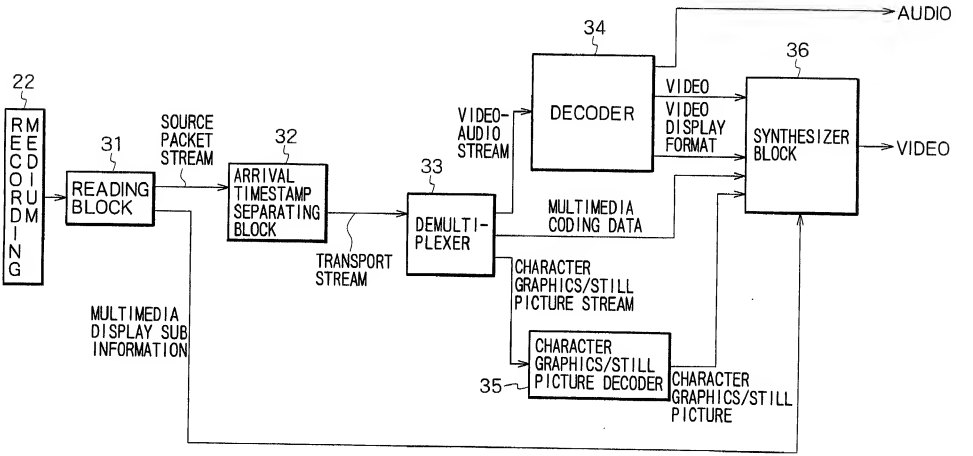

BANDWIDTH
MAXIMUM BIT RATE OF INPUT TS
BIT RATE OF NON-VIDEO STREAMS
BIT RATE OF VIDEO STREAM
TIME
A
B
C

FIG. 21



30

FIG. 22A

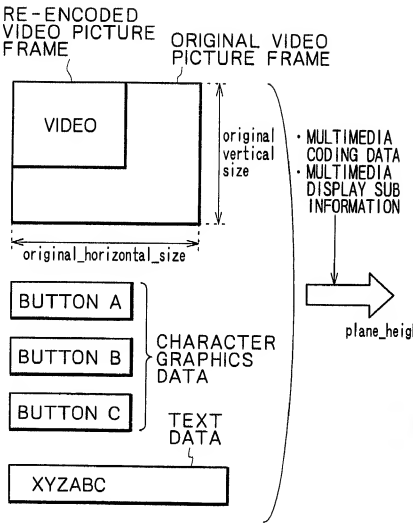


FIG. 22B

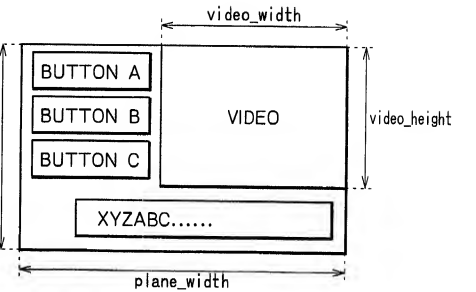


FIG. 23

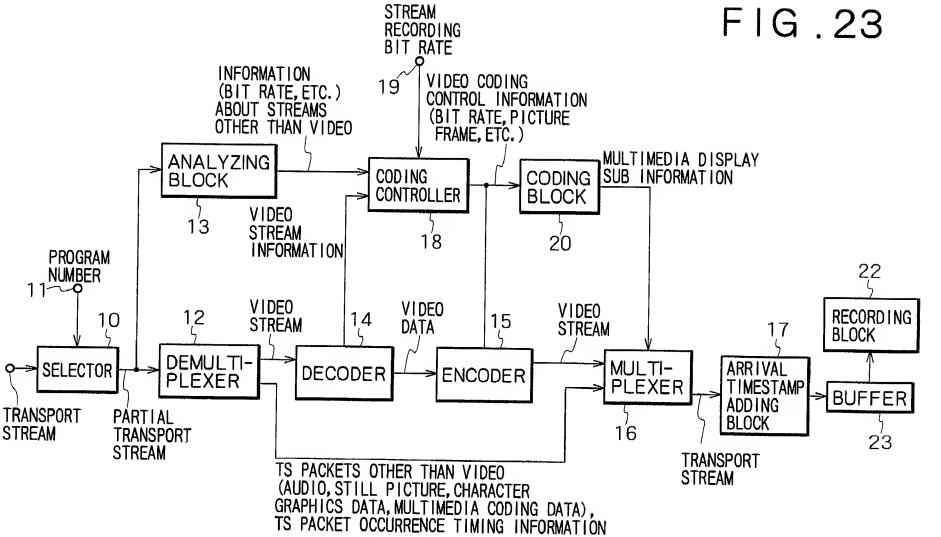


FIG. 24

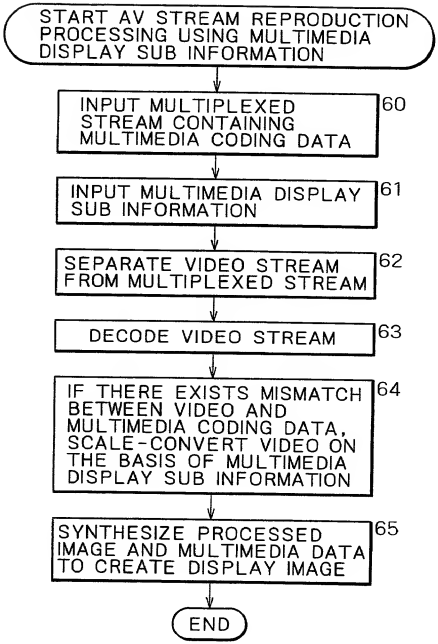

START AV STREAM REPRODUCTION PROCESSING USING MULTIMEDIA DISPLAY SUB INFORMATION
INPUT MULTIPLEXED STREAM CONTAINING MULTIMEDIA CODING DATA
60
INPUT MULTIMEDIA DISPLAY SUB INFORMATION
61
SEPARATE VIDEO STREAM FROM MULTIPLEXED STREAM
62
DECODE VIDEO STREAM
63
IF THERE EXISTS MISMATCH BETWEEN VIDEO AND MULTIMEDIA CODING DATA, SCALE-CONVERT VIDEO ON THE BASIS OF MULTIMEDIA DISPLAY SUB INFORMATION
64
SYNTHESIZE PROCESSED IMAGE AND MULTIMEDIA DATA TO CREATE DISPLAY IMAGE
65
END

FIG. 25

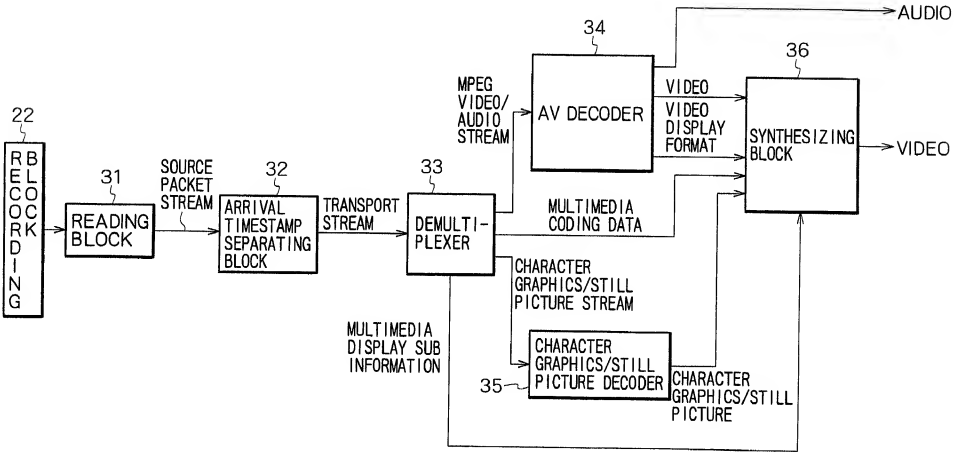
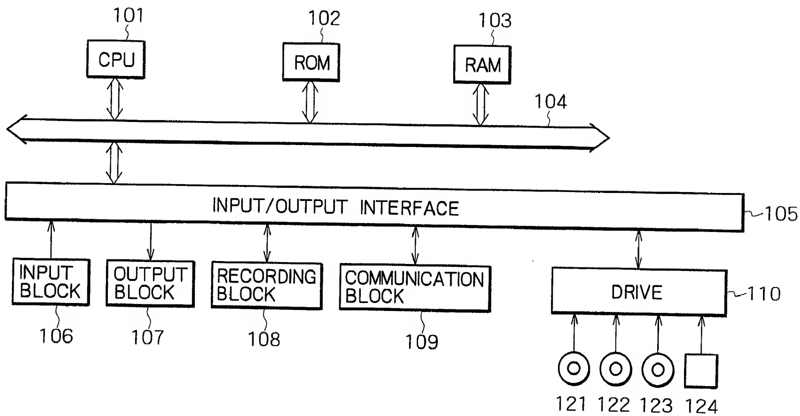


FIG. 26



101
CPU
102
ROM
103
RAM
104
INPUT/OUTPUT INTERFACE
105
INPUT BLOCK
106
OUTPUT BLOCK
107
RECORDING BLOCK
108
COMMUNICATION BLOCK
109
DRIVE
110
121
122
123
124